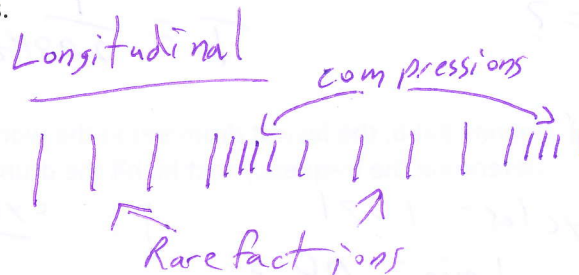
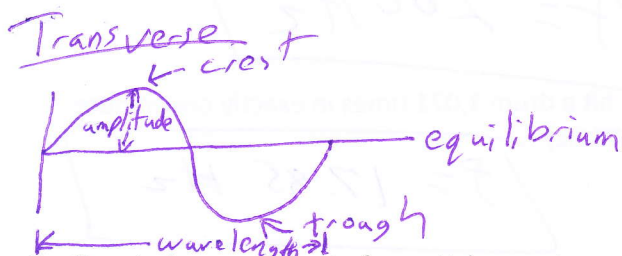


# Physics 20 Waves Review

- 1) Anything in your notes is fair game. Read them over!
- 2) Know your wave words (see handout).
- 3) Sketch and label the two types of mechanical waves.



- 4) Sketch the movement of a particle on a transverse wave.



- 5) What happens when a wave enters a new medium?

- the wave is reflected back and transmitted to the new medium
- depends on our two scenarios:  
low density  $\rightarrow$  high density or high  $\rightarrow$  low density

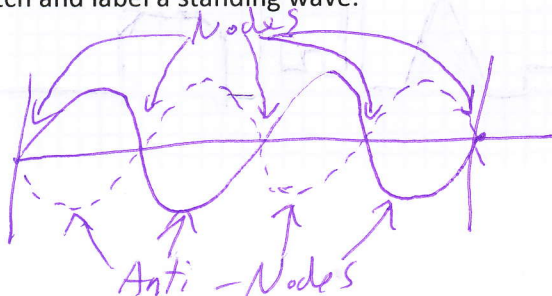
- 6) Explain the concept of periodic motion.

- any motion that repeats itself in regular intervals
- period is time for one complete cycle
- frequency is number of cycles per second

- 7) If the medium a wave is traveling through remains constant, what else must remain constant?

- Frequency
- speed
- wavelength

- 8) Sketch and label a standing wave.



## Problems

- 1) A hummingbird beats its wings 200 times every second. What is the period? What is the frequency?  
(0.005 s, 200 Hz)

$$f = 200 \text{ Hz}$$

$$T = \frac{1}{f} \quad \boxed{T = 0.005 \text{ s}}$$

$$T = ?$$

$$T = \frac{1}{200 \text{ Hz}} \quad \boxed{f = 200 \text{ Hz}}$$

- 2) Johnny Rabb, the fastest drummer in the world, can hit a drum 1,071 times in exactly one minute. Determine the frequency that he hit the drum. (17.85 Hz)

$$\text{cycles} = 1071$$

$$t = 1 \text{ min} = 60 \text{ s}$$

$$f = ?$$

$$f = \frac{\text{cycles}}{t}$$

$$\boxed{f = 17.85 \text{ Hz}}$$

$$f = \frac{1071}{60}$$

- 3) Two slinkies are tied together. A wave in the first slinky travels with a velocity 4.0 m/s and wavelength of 1.5 m. After transmission the velocity in the second slinky is 7.0 m/s. Determine the wavelength in the second slinky. (2.6 m)

$$v_1 = 4.0 \text{ m/s}$$

$$\lambda_1 = 1.5 \text{ m}$$

$$v_2 = 7.0 \text{ m/s}$$

$$\lambda_2 = ?$$

$$\frac{v_1}{\lambda_1} = \frac{v_2}{\lambda_2}$$

$$\lambda_2 = \frac{\lambda_1 v_2}{v_1}$$

$$\boxed{\lambda_2 = 2.6 \text{ m}}$$

$$\lambda_2 = \frac{(1.5 \text{ m})(7.0 \text{ m/s})}{(4.0 \text{ m/s})}$$

- 4) The speed of sound in air is 344 m/s and it has a frequency of 251 Hz. Determine the wavelength. (1.37 m)

$$v = 344 \text{ m/s}$$

$$f = 251 \text{ Hz}$$

$$\lambda = ?$$

$$v = f\lambda$$

$$\lambda = \frac{v}{f}$$

$$\lambda = \frac{344 \text{ m/s}}{251 \text{ Hz}}$$

$$\boxed{\lambda = 1.37 \text{ m}}$$

- 5) Underwater, the wavelength of sound increases to 5.90 meters. Determine the velocity of sound under water. How much faster does the speed of sound travel underwater? (1140 m/s)

$$f = 251 \text{ Hz}$$

$$\lambda = 5.90 \text{ m}$$

$$v = ?$$

$$v = \lambda f$$

$$v = (5.90 \text{ m})(251 \text{ Hz})$$

$$\boxed{v = 1140 \text{ m/s}}$$

- 6) Complete the following superposition of waves:

